

FACTORY AUTOMATION

Mitsubishi Electric Programmable Controller MELSEC iQ-F Series

Quick Connection Guide

Predefined Protocol Support For Positioning Function Block Library

(IAI Corporation)



INTRODUCTION

Thank you for purchasing the MELSEC iQ-F series.

This manual describes Predefined Protocol Support Tool For Positioning and FBs for Predefined Protocol Support for Positioning, which enable positioning operation of the IAI ROBO Cylinder easier than before. Positioning operation is performed by connecting the FX5U CPU module or FX5UC CPU module and the IAI controller.

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the specifications to handle the product correctly.

When applying the program examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.

Regarding use of this product

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, please contact Mitsubishi Electric sales office.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions into the system.

Note

- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained to the local and national standards. If in doubt about the operation or use, please contact your local Mitsubishi Electric representative.
- Mitsubishi Electric will not accept responsibility for actual use of the product based on these illustrative examples. Please use it after confirming the function and safety of the equipment and system.
- The content, specifications etc. of this manual may be changed, for improvement, without notice.
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RELEVANT MANUALS

The following relevant manuals can be downloaded from the Mitsubishi Electric FA site.

www.mitsubishielectric.co.jp/fa/ref/ref.html?kisyu=plcf&manual=download_all

[O: Available, —: Not available]

Manual name	Available form	
<manual number=""></manual>	e-Manual	PDF
MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware) <sh-082452eng></sh-082452eng>	0	0
MELSEC iQ-F FX5 User's Manual (Application) <jy997d55401></jy997d55401>	0	0
MELSEC iQ-F FX5 User's Manual (Serial Communication) <jy997d55901></jy997d55901>	0	0
MELSEC iQ-F FX5 User's Manual (MODBUS Communication) <jy997d56101></jy997d56101>	0	0
MELSEC iQ-F FX5 Predefined Protocol Support for Positioning Function Block Reference (for IAI) <sh-082262eng></sh-082262eng>	0	0
GX Works3 Operating Manual <sh-081215eng></sh-081215eng>	0	0
Predefined Protocol Support Tool For Positioning Operating Manual <sh-082176eng></sh-082176eng>	0	0
PCON, ACON, SCON, RCP6 (PLC Unit) ERC2, ERC3 Serial Communication [Modbus Version] Operation Manual <me0162-10></me0162-10>	-	_
PCON-CB Series Controller Instruction Manual <me0342-4b></me0342-4b>	-	-

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

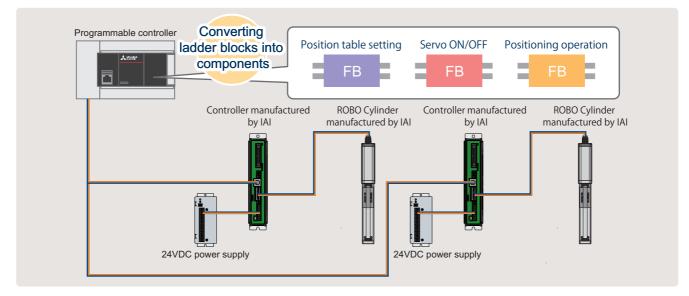
Generic term/abbreviation	Description
FB	An abbreviation for Function Block. The FB is a ladder block that is repeatedly used in a sequence program and designed to be diverted in the sequence program. This improves the efficiency of the program development and reduces the programming errors, resulting in the improvement in the program quality.
IAI	An abbreviation for IAI CORPORATION

KEY FEATURES

Point1

Easy programming using the FB library for Predefined Protocol Support for Positioning^{*1}

FB (function block) library is a collection of FBs that are used in GX Works3. Various settings (position table settings, servo ON/OFF, positioning operation) required to operate the IAI controller or ROBO Cylinder can be configured easily by dragging and dropping FBs from the FB library to a program editor and inputting devices. This can reduce programming cost and time.



*1 FB libraries can be downloaded for free from the Mitsubishi Electric FA website. www.mitsubishielectric.co.jp/fa/ref/ref.html?kisyu=plcf&samplelibrary=download_all

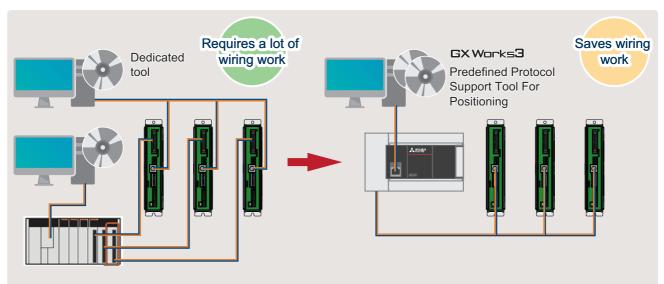
Point2

Easy settings with Predefined Protocol Support Tool For Positioning

Writing positioning data and wiring were required for each controller.

Predefined Protocol Support Tool For Positioning enables a system construction only by wiring the programmable controller to each controller (it is also possible to wire one programmable controller to multiple controllers). This feature reduces the cost and time required for wiring each controller.

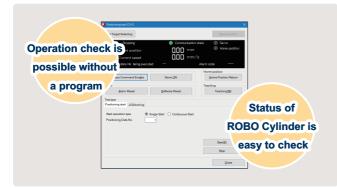
Additionally, communication protocols can be set automatically just with simple settings related to the system configuration. This reduces the cost and time for the protocol specifications of each controller.



Point3

Reduced debugging time thanks to no need for a program

The status of positioning control, alarms occurred, and other information can be checked in a window of Predefined Protocol Support Tool For Positioning without a dedicated HMI (Human Machine Interface) or a program. Therefore, debugging efficiency is dramatically improved.



1 APPLICABLE MODELS

The following models can be used for a series of operations described in this manual.

Programmable controller		IAI controller
FX5U CPU module	FX5UC CPU module	
		The model shown in the figure is of the PCON-CB/
		CGB/CBP/CGBP type.
		■PCON series
		C/CA/CB/CFA/CFB/CF/CY/CYB/SE
		■ACON series
		C/CA/CB/CY/CYB/SE
		■SCON series
		C/CA/CAL/CB (not including servo press
		specifications)
		DCON series
		CA/CB/CYB
		■RCP6S
		RCP6S ^{*1}
		ERC2 series
		Controller-integrated ROBO Cylinder ■ERC3 series ^{*2}
		Controller-integrated ROBO Cylinder

- *1 For the RCP6S series, the specifications do not allow the MODBUS RTU to read or write the position table information register (positioning data). Therefore, positioning data cannot be read or written. When using the RCP6S, use a Teaching Pendant or computer software manufactured by IAI Corporation.
- *2 For the ERC3 series with the controller type set to the MEC mode, connection is not available.

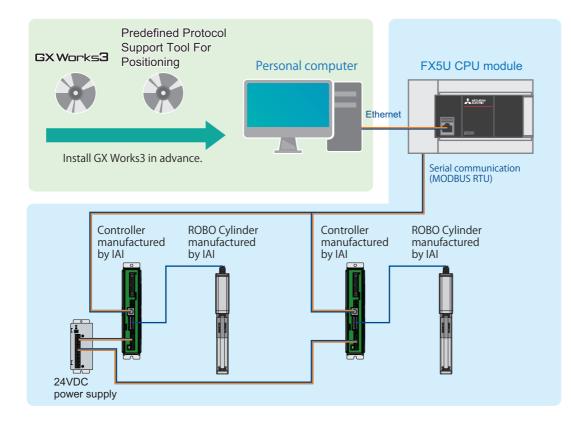
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8

2 PREPARATION

2.1 System Configuration

This section describes the system configuration in which two IAI controllers are connected to one programmable controller.



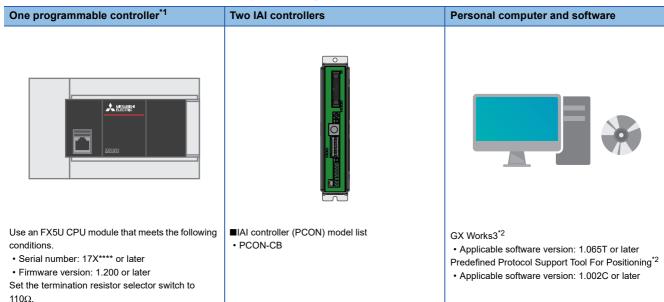
2.2 Required Products

This manual describes the system configuration for positioning operation performed by connecting two IAI controllers (PCON-CB) to a programmable controller (FX5U CPU module).

To use applicable products other than the above, refer to the following manuals.

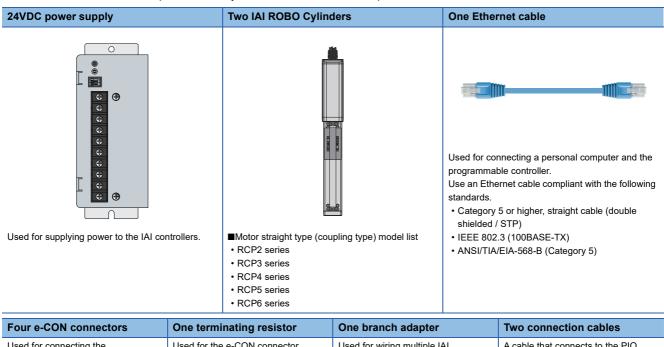
MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware)

Manuals for the IAI controller and ROBO Cylinder being used



*1 To perform serial communication (MODBUS RTU) using a communication board (FX5-485-BD) or communication adapter (FX5-485ADP), settings different from the parameter settings described in this manual are required. Refer to the following for details.

*2 To obtain the latest version, please contact your local Mitsubishi Electric representative.



Four e-CON connectors	One terminating resistor	One branch adapter	Two connection cables
Used for connecting the programmable controller and IAI controllers.	Used for the e-CON connector.	Used for wiring multiple IAI controllers.	A cable that connects to the PIO connector of an IAI controller. • CB-RCB-CTL002

Software

GX Works3 must import the following.

Item	File name	Reference
FB library	PositioningSupportIAI_F.msIm	Page 17 PROGRAMMABLE CONTROLLER SETTINGS

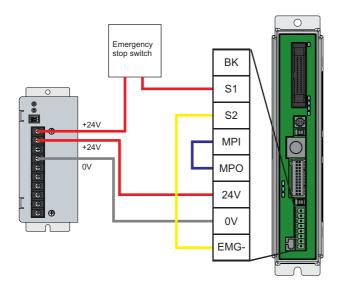
2.3 Wiring

Wiring an IAI controller

This section shows how to wire an IAI controller.

Wiring the power connector

Wire the power connector.



- **1.** Check that the MPI terminal and MPO terminal of the power connector have been short-circuited, and insert the connector into the IAI controller.
- 2. Connect the S1 terminal of the power connector and the +24V terminal of the 24VDC power supply.

Point P

The emergency stop state occurs when +24V power supplied to the S1 terminal is cut. To wire the emergency stop switch, add a dry contact (b contact) to the wired part of the S1 terminal. (24VDC, 10mA or less)

- 3. Connect (short-circuit) the S2 terminal and EMG- terminal of the power connector.
- 4. Connect the 24V terminal of the power connector and the +24V terminal of the 24VDC power supply.
- 5. Connect the 0V terminal of the power connector and the 0V terminal of the 24VDC power supply.

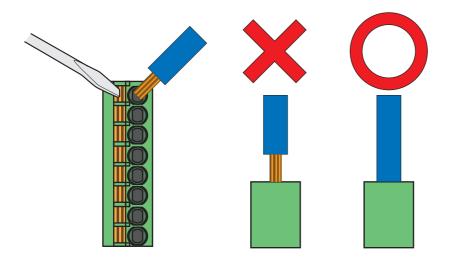
■Installing cables

Treat the sheath of the cable as follows.

• Stripped wire length: 10mm

Insert a cable whose end has been processed fully into the insertion slot.

If the wire cannot be inserted by this method, insert the wire fully while pressing the orange retaining pin using a screwdriver with a 2.0mm to 2.5mm wide flat blade. When the wire is inserted fully, remove the flathead screwdriver.

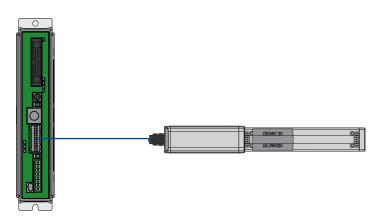


Point P

Pull the wire or bar solderless terminal lightly to check that the wire is securely clamped.

Wiring the IAI ROBO Cylinder

Wire the IAI ROBO Cylinder.



1. Check the direction of each connector of the motor encoder cable, and push the corresponding connectors into the IAI controller and the IAI ROBO Cylinder until the connectors click.

Point P

When wiring a ROBO Cylinder, check that the combination of the controller and the ROBO Cylinder is compatible.

ROBO Cylinder types that can be connected are written on the serial number label on the left side of the controller.

Wiring the programmable controller

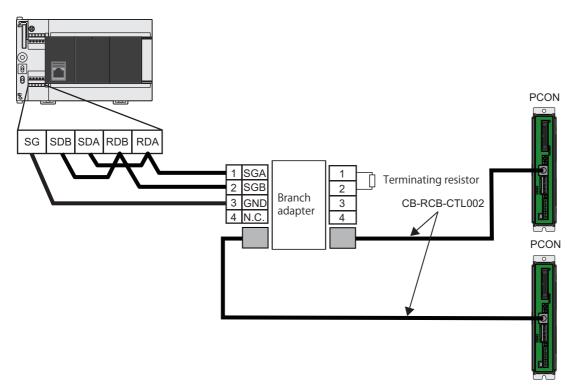
For the power supply wiring of the programmable controller, refer to the following.

Point P

Set the terminating resistor by using the programmable controller. Set 110Ω with the termination resistor selector switch of the programmable controller.

Wiring the IAI controllers

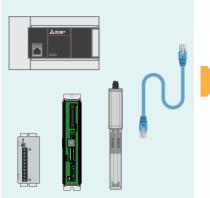
Wire the IAI controllers.

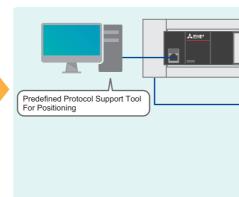


- **1.** Wire e-CON connectors to the programmable controller. Wire two sets of e-CON connectors on the external device communication cable side in the same manner.
- 2. Connect a cable for communicating with an external device to the SIO connector of each IAI controller. (2 sets)
- 3. Using the branch adapter, connect the programmable controller and two IAI controllers.

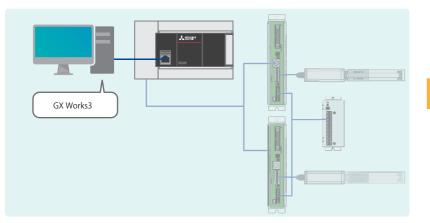
2.4 Operation Flow Diagram

- **1.** Preparing the required products (wiring)
- 2. Setting the IAI controllers

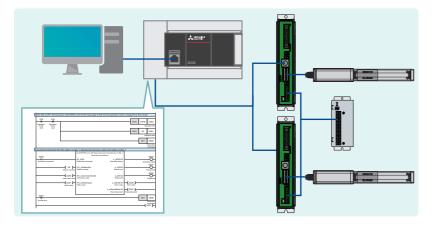




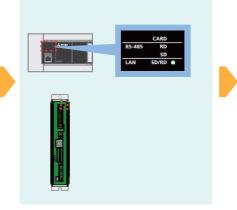
3. Setting the programmable controller



5. Program examples and checking the operation



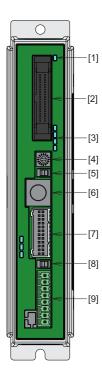
- **4.** Checking the communication status



3 IAI CONTROLLER SETTINGS

3.1 Part Names

This section shows the part names of an IAI controller (PCON-CB).



No.	Name	Description
[1]	Controller status LED	Shows the operating status of the controller. SV on (green): Servo ON SV flashing (green): Automatic Servo OFF ALM on (red): Alarm (operation release level or higher), motor driving power supply OFF, emergency stop Both SV and ALM on (orange): Initialization at power-on in progress Off: Control power supply OFF, Servo OFF
[2]	PIO connector/Field network connector	Connector for I/O signal connections for control in the PIO specifications. Connector for each field network in the field network specifications.
[3]	Current/alarm monitoring LED	Normally indicates the command current ratio. When an alarm occurs, the alarm code will be indicated. For details on the command current ratio (ratio against the rated value) according to each LED combination, refer to the following.
[4]	Axis number setting switch	Switch for setting an axis number when operating multiple axes through serial communication or when performing gateway operations. When an SIO converter is used, multiple axes can be controlled without removing/reinserting the communication cable connector from/into the teaching tool. Settings for a maximum of 16 axes can be made using hexadecimal numbers from 0 to F. To change the axis number, rotate the arrow by using a flathead screwdriver. The setting of the axis number setting switch is loaded when the controller is powered on. Switching the setting at other times is invalid.
[5]	Operation mode setting switch	 Switch for interlocking. AUTO: Automatic operation by the PIO signal becomes possible. Only monitoring operation is possible from the teaching tool. MANU: Operation from the teaching tool is possible.
[6]	SIO connector	Connector for connecting a communication cable for a teaching tool, gateway unit, etc. Used for connecting to a programmable controller.
[7]	Motor encoder connector	Connector for connecting a motor encoder cable for a ROBO Cylinder.
[8]	Brake release switch ^{*1}	Switch for forcibly releasing the brakes of a ROBO Cylinder with brakes. • BK RLS: Forcibly release brakes. • NOM: Normal operation (brakes enabled)

No.	Name	Description	
[9]	Power connector	Connector for supplying each type of power (controller control power, Robo Cylinder power, brake control power) and inputting emergency stop status signals.	
ne	*1 For normal operation, make sure to set the brake release switch to the NOM side. (Set the switch to the BK RLS side only when necessary, such as adjustment at start-up.) If the switch remains set to the BK RLS side, even when the Servo OFF state arises, the brakes do not activate.		

In vertical installations, a workpiece may drop, causing injury or damage to the workpiece.

Point P

For details on IAI controllers other than the PCON-CB, refer to the following.

3.2 Setting Switches

The following table shows the switches of IAI controllers that are required to be set.

Name	Setting details
Axis number setting switch	Set this switch to any axis number.
Operation mode setting switch	Set this switch to the AUTO side.
Brake release switch	Set this switch to the NOM side.

3.3 Parameter Settings

Set the parameters for IAI controllers with Predefined Protocol Support Tool For Positioning. Refer to the following for details.

Page 21 Parameter settings of Predefined Protocol Support Tool For Positioning

4 PROGRAMMABLE CONTROLLER SETTINGS

4.1 Part Names

For the part names of the programmable controller, refer to the following.

4.2 Parameter Settings

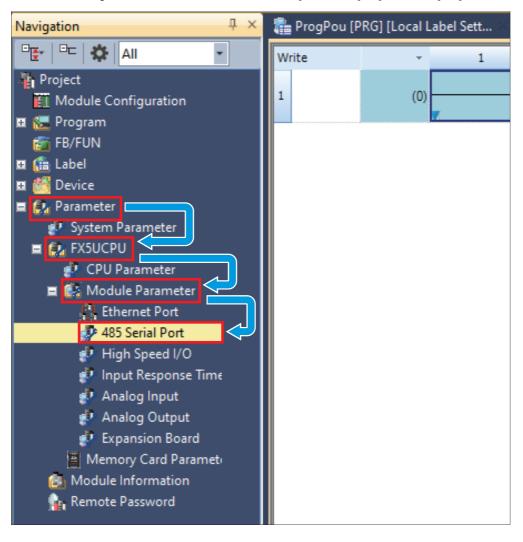
This section describes how to set parameters required for the programmable controller using GX Works3 and Predefined Protocol Support Tool For Positioning.

GX Works3 parameter settings

This section describes how to set parameters required for the programmable controller using GX Works3. Connect the personal computer and the programmable controller with an Ethernet cable.



1. In the "Navigation" window of GX Works3, select [Parameter] ⇒ [FX5UCPU] ⇒ [Module Parameter] ⇒ [485 Serial Port].



Point P

If the "Navigation" window is not displayed, select [View] on the toolbar \Rightarrow [Docking Window] \Rightarrow [Navigation] to open the window.

2. In "Communication Protocol Type", select "Predefined Protocol Support Function".

Module Parameter 485 Serial Port			
Setting Item List	Setting Item		
Input the Setting Item to Search	Item	Setting	
	Communication Protocol Type	Set communication protocol type.	
	Communication Protocol Type	Predefined Protocol Support Function	\sim
		MELSOFT Connection	
E- 🚮 Basic Settings		Non-procedural	
Communication Protocol Type		MC Protocol	
		MODBUS_RTU Communication	
		Predefined Protocol Support Function	
		Inverter Communication	
		N:N Network	
		Parallel Link	
	Explanation		
	Set communication protocol type.		^
	Set communication protocortype.		<u>^</u>
			~
Item List Find Result	Chec <u>k</u> Re	store the Default Settings	
			Apply

3. When the confirmation window appears, click the [Yes] button.

MELSOF	FGX Works3	\times
	The set data will been discarded. Are you sure you want to discard the data? [Caution] To restore the previous data after changing, please close Project Data without saving and open the Project Data again.	
	<u>Y</u> es <u>No</u>	

4. Set "Advanced Settings" as follows, and click the [Apply] button.

Setting Item List	Setting Item		
	literer .	Setting	
Input the Setting Item to Search	Communication Protocol Type	Set communication protocol type.	
	Communication Protocol Type	Predefined Protocol Support Function	
	Advanced Settings	Set detailed setting.	
Basic Settings	Data Length	8bit	
Communication Protocol Type	Parity Bit	None	
Advanced Settings	Stop Bit	1bit	
	Baud Rate	38,400bps	
	Evelopation		
	Explanation Set baud rate.		┢
tem list Find Result	Set baud rate.	sstore the Defaylt Settings	T

Item	Setting value
Data Length	8 (Default value: 7)
Parity Bit	None (Default value: Odd)
Stop Bit	1bit (Default value: 1bit)
Baud Rate	38400bps (Default value: 115200bps)

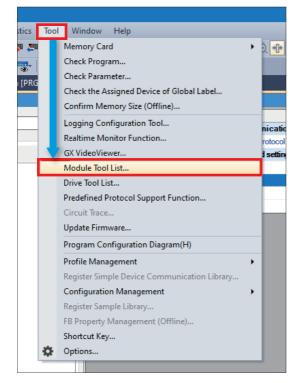
Point

For the settings in "Advanced Settings" except "Baud Rate", be sure to set the above values.

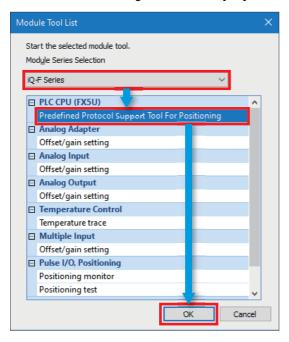
Parameter settings of Predefined Protocol Support Tool For Positioning

This section describes how to set parameters required for the programmable controller using Predefined Protocol Support Tool For Positioning.

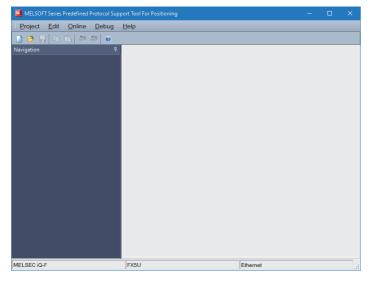
1. Select [Tool] ⇒ [Module Tool List] from the menu of GX Works3.



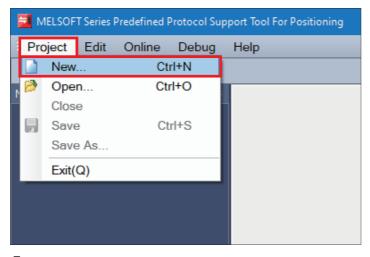
2. For "Module Series Selection" in the "Module Tool List" window, select "iQ-F Series" and "Predefined Protocol Support Tool For Positioning", and click the [OK] button.



3. The "Predefined Protocol Support Tool For Positioning" window opens.



4. Select [Project] on the toolbar ⇒ [New].



5. Select "IAI" under "Select Manufacturer", select the checkbox of "CH1" under "The channel to be used", then click the [OK] button.

Ne	w	×
	Select <u>Manufacturer</u>	
	The channel to be used CH1(1) CH3(3)	
	CH2(2) CH4(4)	

Point P

The channel used is determined as follows.

- Built-in RS-485 communication terminal block of the CPU module: CH1
- Expansion board: CH2
- Expansion adapter: CH3, CH4

4

6. Configure settings as shown in the following window, and click the [Apply] button.

MELSOFT Series Predefined Protocol Supp	oort Tool For Position	ing (Unti	tled Project)						
<u>Project Edit Online D</u> ebug	<u>H</u> elp								
🗋 🤌 🛃 🗈 🛅 🐺 🐺 🌒									
Navigation 🕂	Connected model se	etting ×							•
Connected model setting	Connected model s	etting							^
CH1(IAI)	Item		CH1						
	Manufacturer	IAI							
	End axis No.	2						_	
	Axis1Model		-CA/CB/CFA/CFB					`	
	Axis2Model	12:PCON	-CA/CB/CFA/CFB						
	Axis3Model Axis4Model	_							
	Axis5Model	-							
	Axis6Model								
	Axis7Model								
	Axis8Model	_							
	Axis9Model	_							
	Axis10Model								
	Axis11Model								
	Axis12Model	_							
	Axis13Model								
	Axis14Model								
	Axis15Model								
	Axis16Model								
				_					
	Protocol send/rece	eive setting	I.						
			ltem		CH1				
			ta area) before protocol	execution	Yes				
	Receive Wait Tir				30				
	Number of Send				3				
	Send Retry Inter				100				
	Send Standby Ti				0				
	Send Monitoring	Time [×10	0ms]		30				~
	Description								
	Please select the mod	del connect	ted to the axis.						~
	When the positioning	data is set	, once you change the r	nodel to the unse	lected state, the po	sitioning data setting i	s initialized		
	positioning	0010 10 001	, ende yee ondrige trie i		ionica ciato, trio po	and and acting the			7 .
	L							V	*
								Арр	oly
MELSEC iQ-F	FX5U				Ethernet		_		

7. To save the protocol setting data, select [Project] ⇔ [Save As], and save it using any name.

8. Select [Project] \Rightarrow [Exit] to close the window.

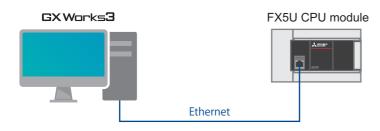
Precautions

The following devices are used to write predefined protocol information. Make sure not to overlap with the devices used for other controls.

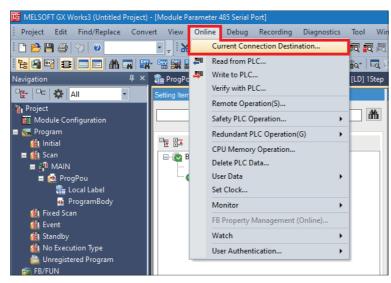
Device type	Device number
File register	R0 to R1801

4.3 Communication Test for the Programmable Controller

Directly connect the Ethernet ports as shown below.



1. Select [Online] ⇒ [Current Connection Destination].



2. Select "Direct Coupled Setting".

Connection Destination Simple	e Setting Connection		×
Direct Coupled Setting Please select the direct co	onnection method with	CPU module.	
• Ethernet			
Directly communicate with it is not required to specifi	h the CPU module with fy the IP address of CPU		ract counted settings
Adapter	Not Specified		~
		_	
IP Address of Adapter		Commur	nication <u>T</u> est
Other Connection Method			
Select this method if you CPU module with a conne than the direct coupled se	ction method other	(Open the Sp	ection Method ecify Connection on window)
Do not show this dialog * Always open the Spe Connection Destination	cify	ОК	Cancel

3. Specify an Ethernet adapter of the personal computer which is used when the personal computer is directly connected to the CPU module.

When "Not Specified" is set, select an adapter to be used from the drop-down list.

Connection Destination Simpl	e Setting Connection	×
Direct Coupled Setting Please select the direct co	onnection method with CPU m	odule.
● <u>E</u> thernet		
	Ethernet Board Etherne h the CPU module without usin fy the IP address of CPU modu	ig a hub.
	* This setting is applied to all	Ethernet port direct coupled settings.
<u>A</u> dapter	Not Specified	~
IP Address of Adapter		Communication <u>T</u> est
O Other Connection Method	i —	
Select this method if you CPU module with a conne than the direct coupled so	ction method other	Other Connection Method (Open the Specify Connection Destination window)
Do not show this dialog * Always open the Spe Connection Destination	ocify OK	Cancel

4. After the adapter is selected, click the [Communication Test] button.

Connection Destination Simple	e Setting Connection	
Direct Coupled Setting Please select the direct co	onnection method with CPU m	odule.
● <u>E</u> thernet		
	Ethernet Board Etherne h the CPU module without usin fy the IP address of CPU modu	ig a hub.
	* This setting is applied to all	Ethernet port direct coupled settings.
<u>A</u> dapter	States Change Come Son	NIT HE
IP Address of Adapter	10.97.219.90	Communication <u>T</u> est
O Other Connection Method	I	
Select this method if you CPU module with a conne than the direct coupled se	ction method other	Other Connection Method (Open the Specify Connection Destination window)
Do not show this dialog * Always open the Spe Connection Destination	cify OK	Cancel

For the connection via a hub, refer to the following.

MELSEC iQ-F FX5 User's Manual (Ethernet Communication), Section 4.2 Connection Via a Hub

4.4 Writing Data to the Programmable Controller

This section describes how to write each parameter setting and program to the programmable controller.

For details on programs, refer to the following.

Page 33 PROGRAM EXAMPLE

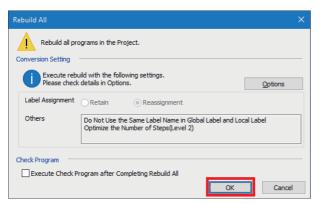
Writing GX Works3 parameter settings

1. Perform the operation to determine the programs and the parameters before writing them to the programmable controller.

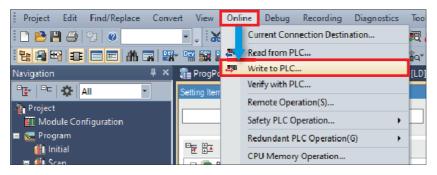
Select [Convert] ⇒ [Rebuild All].

👪 MELSOFT GX Works3 (Untitled P	roject	t) - [Moo	dule Paramete	r 485 Serial F	^o ort]	
Project Edit Find/Replace	Con	vert \	/iew Online	Debug	Recordin	ng Diagn
i 🗅 🔁 💾 🎒 😒 🖉	Þ	Conve	rt(B)		F4	56
	1	Online	Program Cha	nge S	hift+F4	🊧 🐎
Navigation		Rebuil	d All	Shift+	Alt+F4	ProgPo
		CI 1	. .			
🖳 🗠 🗱 🗛 🖓		Check	Syntax		•	
□ 📴 🛛 🗠 🗱 🔤 All 🔹			Syntax m File Setting		,	
Project Module Configuration		Progra	-		• ng	
Project		Progra	m File Setting		•	

2. Click the [OK] button.



3. Select [Online] ⇒ [Write to PLC].



4. Click "Parameter + Program", and click [Execute].

.	=	Read 🛄	ø	Vert		Delete			
Parameter + Open/(Program(E) Select All e All(T) Deselect All(N)	Legend CPU	Built-in Me	mory	I SD	1emory Card 🔞) Intelligent Function Module		
fodule Nan	ata Name	*		6	Detail	Title	Last Change	Size (Byte)	
I-¶n Un	d Project								
e 🚯	ameter								
	System Parameter/CPU Parameter	¥.					9/15/2022 9:12:28 AM	Not Calculated	
- (Module Parameter						9/15/2022 9:15:30 AM	Not Calculated	
	Memory Card Parameter						9/15/2022 9:12:27 AM	Not Calculated	
	Remote Password						9/15/2022 9:12:27 AM	Not Calculated	
🕀 🐔	bal Label								
1.1	Global Label Setting						9/15/2022 9:12:29 AM	Not Calculated	
🕀 🌄	gram								
	MAIN						9/15/2022 9:12:29 AM	Not Calculated	
🗆 🖪	vice Memory								
	MAIN				Datail		9/15/3022 9-12-29 AM	-	
Disp iory Capaci	amory Capacity 😵 🗌 Cher Program Namory —	k Memory Capacit	y before Wr	iting				Fo	м
Size CAN	*							64	000/640005tep
pend Used	Data Memory Program:1024/1024KB	Re	storation Inf	br1024/102	KB F	arameter:1024/1024KB	Device Comment:2048/	204888	
Increased Decreased	SD Memory Card							Fri 0,0	
Free: 5%	ss Program.0/0KB	Re	storation Inf	0:0/0KB		arameter:0/0KB	Device Comment/0/0K8		

5. When the following window appears, click [Yes to all].

MELSOFT GX Works3						
	The following file already exist Are you sure you want to overw					
System Para CPU Parame Module Para Program File	eter meter	^				
		~				
<u>Y</u> es						
No	N <u>o</u> to all	Cancel				

6. After the writing is complete, reset or power off and on the programmable controller.

Writing the parameter settings of Predefined Protocol Support Tool For Positioning

1. Write protocol setting data to the CPU module.

Select [Online] on the toolbar ⇒ [Write the Predefined Protocol Information].

MELSOFT Series Predefined Protocol Support Tool For Positioning (Untitled Project)										
<u>Project</u> <u>E</u> dit	<u>O</u> n	<u> Debug H</u> elp								
📄 🤌 🗐 🗈		Writ	e the Pred	efine	ed Protocol Info	ormation				
Navigation	2 9	Read Positioning Data								
- 🙆 Connected m		Write Positioning Data								
Positioning da	ata				Item	CH1				
CH1(IAI) Axis1(PCON-CA/CB/CFA/CFB)					Manufacturer	IAI				
Axis2(PCON-CA/CB/CFA/CFB)					End axis No.	2				
					Axis1Model	2:PCON-CA/CB/CFA/CFE				
					Axis2Model	2:PCON-CA/CB/CFA/CFE				

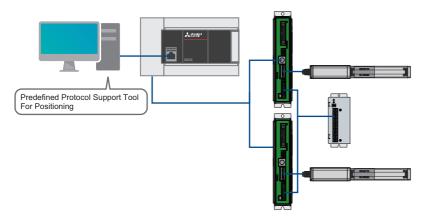
2. Select "CPU built-in memory" under "Target memory", and click the [Execute] button.

W	rite the predefined protocol information	×
	Target memory	
	CPU built-in memory V	
	The predefined protocol setting is enabled at the ollowing timing. - When the CPU module is powered off and on - When the CPU module is reset	
	The following devices will be occupied. Use and her device if it is used in the program. R0~R1801 Execute Close	

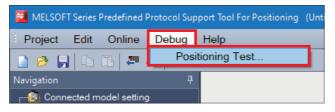
3. Reset or power off and on the programmable controller to reflect the settings.

4.5 Positioning Test

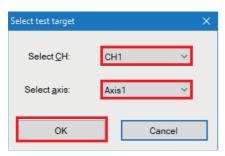
After the writing process, perform a test for communication with the IAI controllers.



1. In the menu bar of "Predefined Protocol Support Tool For Positioning", select [Debug] ⇒ [Positioning Test].



2. Select a channel number and an axis number for the test target in the "Select test target" window, and click the [OK] button.



3. The "Positioning test" window appears.

Positioning test (CH1)		X
Test Target Selection		Reconnection
Axis1 Stopping	Communication s	state 🔘 Servo
Current position	8.80 mm	Home position
Current speed	0.00 mm/s	S
Positioning data No. being execu	ted —	Alarm code 🛛 ——
Servo		Home position
Modbus Command Ena <u>b</u> le	Servo <u>O</u> N	<u>H</u> ome Position Return
Alarm		Teaching
<u>A</u> larm Reset	Software Reset	Teaching(<u>M</u>)
Test type		
Positioning start JOG/Inching		
Start operation type	Single Start O Continuous Start	
Positioning Data No.	1	
		Start(P) Stop
		Close
Point 2		
To chang	e the test target, use the	[Test Target Selection] but
🧾 Positio	ning test (CH1)	
Test Ta	rget Selectio <u>n</u>	
Axis1	Stopping	
	Current position	
	earrent position	

4

- 4. When the [Modbus Command Enable] button is displayed, click the button.
- **5.** When the [Servo ON] button is displayed, click the button.

Current speed Positioning data No. being executed

6. Click the [Home Position Return] button.

7. When the preparation is completed, both lamps of "Servo" and "Home position" are ON in the monitor area.

Test Target Selection		<u>R</u> econnection
Axis1 Stopping	Communication state	Servo
Current position	888 mm	Home position
Current speed	🚺 🚺 mm/s	
Positioning data No. being executed	— Alarm o:	ode —

Positioning start

Specify a number and execute positioning data.

1. Select the [Positioning start] tab.

Test type Positioning start JOG/Inching	9		
Start operation type Positioning Data No.	Single Start	⊖ Cont <u>i</u> nuous Start	
			Start(P)
			Stop

- 2. Enter a positioning data number to be executed in "Positioning Data No.".
- 3. Click the [Start] button.
- **4.** By clicking the [Stop] button, the positioning control being performed is decelerated and stopped.

JOG/Inching

Set the speed or movement amount, and move the current position of the axis.

1. Select the [JOG/Inching] tab, then click the [JOG/Inching Setting] button.

ositioning start	JOG/Inching	T
● JOG	250 mm/s	JOG/Inching Setting
O Inching	1.00 mm	
		For <u>w</u> ard Rotation

2. Enter the JOG operation speed or the amount of movement at inching operation in the "JOG/Inching setting" window.

JOG/Inching setting	×
JOG speed Inching movement amount	1 mm/s (1mm/s to 250mm/s) 0.01 mm (0.01mm to 1.00mm)
*The controller needs to be rest amount is changed.	arted when JOG speed or the inching movement
	Setting Close

Item	Description
JOG speed	Enter the JOG operation speed.
Inching movement amount	Enter the travel distance of inching operation per time.

3. Click the [Setting] button in the "JOG/Inching setting" window.

4. When the confirmation window appears, click the [Yes] button.

MELSOFT	Series Predefined Protocol Support Tool For Positioning $\qquad imes$	
1	The JOG speed/Inching movement amount will be changed. Are you sure you want to continue? *If changing, the servo of the controller will be turned off and restarted. Are you sure you want to continue?	
	<u>Y</u> es <u>N</u> o	

- 5. Click the [Servo ON] button.
- **6.** Select "JOG" or "Inching" in the [JOG/Inching] tab.
- JOG: The current position moves at the set speed while the [Forward Rotation] or [Reverse Rotation] button is being
 pressed.
- Inching: The current position moves by the set movement amount each time the [Forward Rotation] or [Reverse Rotation] button is clicked.
- 7. Click the [Forward Rotation] or [Reverse Rotation] button.
- · Forward Rotation: The current position moves in the positive direction.
- Reverse Rotation: The current position moves in the negative direction.

Point P

When "Inching" is selected, an inching is performed by the following key input.

- Forward Rotation:
- Reverse Rotation: 🔟

When "JOG" is selected, JOG operation is not performed even if the 🕅 and 🔟 keys are pressed.

5 PROGRAM EXAMPLE

5.1 Operation

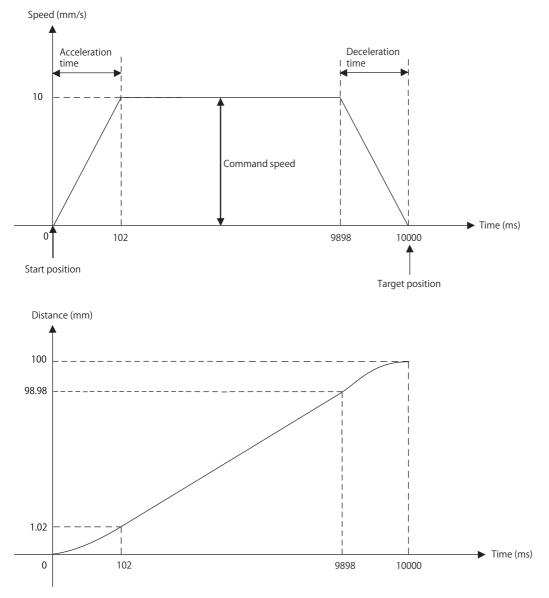
The following shows an example of using this FB library for configuring the position table setting and performing the home position return and positioning operation for the IAI controller. The following FBs are used in this example.

- M+IAIMonitoring_F (Operation monitor)
- M+IAIWritePositioningTable_F (Position table setting)
- M+IAIStartHomePositioning_F (Home position return)
- M+IAIStartPositioning_F (Positioning operation)
- M+IAIServoContorol_F (Servo ON/OFF)

Overview of program example

Perform monitoring to check the status of the IAI controller. Then, write the position table information to the position table No.0 of axis 1 and the position table No.0 of axis 2 of the IAI controller with the following settings. After writing information, perform a home position return, and move the ROBO Cylinder to the position which is 100mm away from the home position. If the error code 203H occurs during the operation, reset the alarm that has occurred in the IAI controller.

- Target position: 100mm (0.01mm × 10000)
- Positioning width: 1mm (0.01mm × 100)
- Acceleration: 0.01G
- · Command speed: 10mm/s
- Deceleration: 0.01G



5.2 FB Library

Downloading the FB library

In this manual, the Predefined Protocol Support for Positioning Function Block Reference (for IAI) is used. To obtain the FB library, please contact your local Mitsubishi Electric representative.

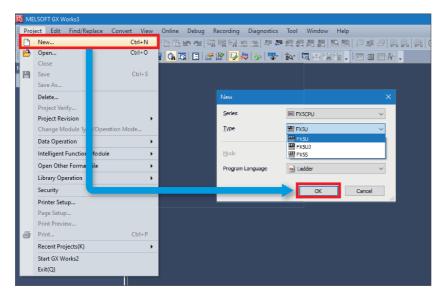
Importing the FB library

This section describes how to register the obtained FB library to GX Works3. Decompress the FB library folder (zip file) before registering the FB library.

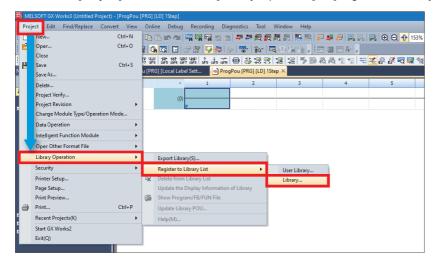
1. Start GX Works3, and select [Project] on the toolbar ⇒ [New].

In this manual, the following settings are used.

Item	Description
Series	FX5CPU
Туре	FX5U
Program Language	Ladder



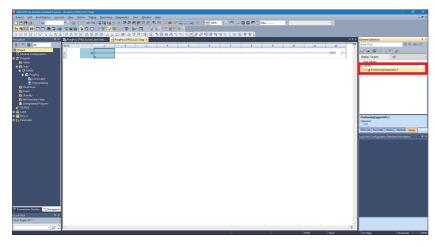
2. Select [Project] on the toolbar ⇒ [Library Operation] ⇒ [Register to Library List] ⇒ [Library].



3. Select the "PositioningSupportIAI_F.msIm" file in the decompressed FB library folder, and click [Open].

→ × ↑ 📙 › 1	This PC > Desktop > fb_positioningsupport	IGI_1_V IV5 >		✓ ^ひ , [○] Searc	h fb_positioningsuppo
rganize 🔻 New fol					III • 🔲 (
Ouick access	Name	Date modified	Туре	Size	
	Manual_Chinese	9/15/2022 9:59 AM	File folder		
	Manual_English	9/15/2022 9:59 AM	File folder		
Downloads #	Manual_Japanese	9/15/2022 9:59 AM	File folder		
Documents #	ProiectData	9/15/2022 9:59 AM	File folder		
Pictures 🕫	PositioningSupportIAI_F.msIm	9/11/2020 11:01 AM	MSLM File	1,572 KB	
Videos OneDrive					
This PC					
Network					
File	name: PositioningSupportIAI_F.msIm			 Library (*.r 	nslm)

4. The selected file is added to [Library] in the "Element Selection" window.



Point P

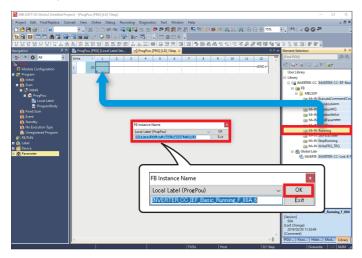
If the "Element Selection" window is not displayed, select [View] on the toolbar \Rightarrow [Docking Window] \Rightarrow [Element Selection] to open the window.

How to use the FB library

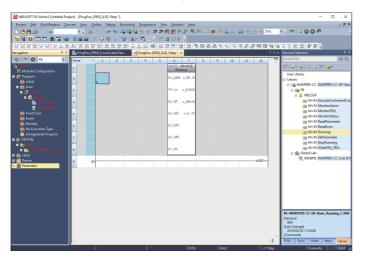
Select an FB registered in the library from the "Element Selection" window, and drag and drop it to the program editor. Create an input ladder and an output ladder of the pasted FB to create a program.

Arrange the FB input ladder to the left side, and output ladder to the right side of the window in the same manner as standard ladder programs.

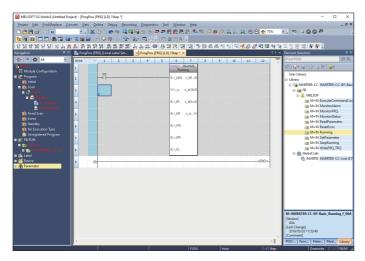
1. Go to the "Element Selection" window ⇒ the [Library] tab ⇒ [Library]. Then, select an FB to be used and drop it in the program editor. When the "FB Instance Name" window appears, click the [OK] button.



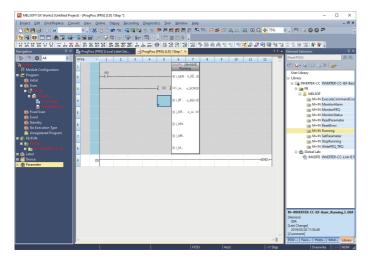
2. The FB is pasted to the program editor.



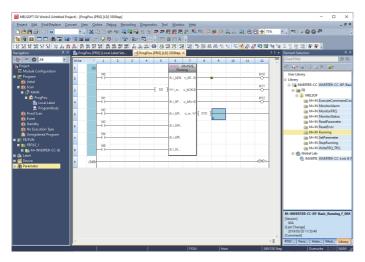
3. Insert a contact and input to B:i_bEN.



4. Insert an FB Word device input to the left side of the FB. Insert an FB Word device output to the right side of the FB.



5. Repeat these steps to create the ladder.



5.3 Program Details

When using e-Manual Viewer, the program copy function is available to perform programming. For details, refer to the following.

🖙 Page 57 How to Use the Program Copy Function of e-Manual

Target channel setting

	MO									
-	$\dashv \vdash$	_	 			 	MOV	K1	DO	Sets the target channel to 1

Target axis setting

M1					 - MOV	121	D1	
11						NI.	DI	Sets the target axes to 1
								Sets the target axes to 1 and 2
					MOV	K2	D2	

Position table No. setting

M2 	 				 - MOV	КО	D3	Sets the position table Nos. to 0 (axis 1) and 0 (axis 2)
					 MOV	K0	D4	

5

IAI controller monitoring

By turning on i_bEN (Execution command), the status of the IAI controller is monitored by M+IAIMonitoring_F (Operation monitoring).

When o_bMonitorOK (Monitoring status) is on, the monitoring table information of the IAI controller is stored in

o_stMonitoringTable (Monitoring table).

For details on how to access stLabel4 and stLabel5, which are local labels of the structure type (stMonitoringTable), refer to the following.

IP Page 50 Acquiring the alarm that has occurred in the IAI controller

		M_IAIMonitoring_F_00A_ Monitor and	1 (M+IAIMonitoring_F_00A) 1 alarm reset FB		
M10 		- B: i_bEN	o_bENO :B		M12
		-UW: i_uStartIONo	о_ЬОК :В		M13
Target channel: 1	{ D0]	- UW: i_uCh	o_bErr :B		M14
Target axis: 1	{ D1]	- UW: i_uAxis	o_uErrId :UW	-[D10]	
M11		B: i_bAlmReset	o_bUnitErr :B·		M15
			o_uUnitErrId :UW-	-{ D11 }	
			o_bMonitorOK :B		M16 O
			o_stMonitoringTable :DUT	-[stLabe14]	
		M_IAIMonitorins_F_00A_ Monitor and	2 (M+IAIMonitoring_F_00A) 1 alarm reset FB		
		- B: i_bEN	o_bENO :B		M112
		-UW: i_uStartIONo	о_ЬОК :В		M113
Target channel: 1	[D0]	- UW: i_uCh	o_bErr :B·		M114
Target axis: 2	[D2]	- UW: i_uAxis	o_uErrId :UW·	-{ D110 }	
M111		B: i_bAlmReset	o_bUnitErr :B·		M115
			o_uUnitErrId :UW·	-[D111]	
			o_bMonitorOK :B·		M116
			o_stMonitoringTable :DUT	-[stLabe15]	

For details on o_stMonitoringTable (Monitoring table), refer to the following.

MELSEC iQ-F FX5 Predefined Protocol Support for Positioning Function Block Reference (for IAI), Section 2.1 Common Specifications

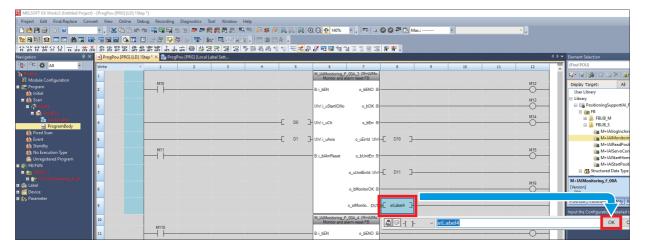
■Redefining local labels

When the above program examples are copied and pasted, the function blocks and local labels stLabel4 and stLabel5 become undefined.

- For details on how to redefine function blocks, refer to the following.
- Page 57 How to Use the Program Copy Function of e-Manual

The method for redefining local labels stLabel4 and stLabel5 is explained in the following.

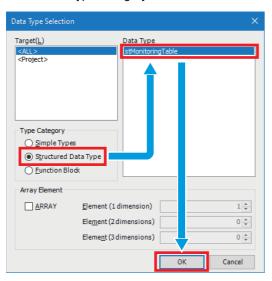
1. Double-click the undefined local label stLabel4, and click the [OK] button.



2. Click the See More button for "Data Type".

Undefined Label	Registration	×						
	lobal label or local label. bel information to be registered.							
<u>L</u> abel Name	Name stLabel4							
Label Setting In	formation							
<u>R</u> egistered Destination	Local Label(ProgPou) V							
Cla <u>s</u> s	VAR 🗸							
Data T <u>y</u> pe	Bit							
Co <u>n</u> stant								
Co <u>m</u> ment								
Op <u>e</u> nthel set the lab	abel editor and el details after registering label information.							
Re <u>q</u> ister a	label at the last row.							
	OK Cancel							

3. Go to "Type Category" ⇒ select "Structured Data Type" and "stMonitoringTable", then click the [OK] button.



4. Select the [Navigation] window ⇒ "Program" ⇒ "Scan" ⇒ "MAIN" ⇒ "ProgPou" ⇒ "Local Label", and check that local label stLabel4 is defined.

👪 MELSOFT GX Works3 (Untitled Project)	- [ProgPou [PRG] [Local Label Setting]]									
<u>Project Edit Find/Replace Conve</u>	ert <u>V</u> iew <u>O</u> nline De <u>b</u> ug <u>R</u> ecor	rding <u>D</u> iagnostics <u>T</u> ool <u>W</u> indow	<u>H</u> elp							
i 🗅 📂 💾 🎒 🙄 🥥	- 📮 🐱 🗈 🛅 🗠 🕿 🖼 🙀	🖙 🖄 🍋 📮 🚝 👧 👧 🗮 😽	d 🔛 🗦 💀							
<mark>! : : : : : : : : : : : : : : : : : : :</mark>										
·····································										
Navigation 4 ×	👖 ProgPou [PRG] [LD] 1Step * 🛛 👔	ProgPou [PRG] [Local Label Sett ×								
🖳 🗠 🗱 All	<filter></filter>	Show Details(Y) 📎 Dis	play Setting							
-in Project	Label Name	Data Type								
Module Configuration	1 M_IAIMonitoring_F_00A_1	M+IAIMonitoring_F_00A								
🖃 🌄 Program	2 M IAIMonitoring E 00A 2	M+IAIMonitoring E 00A								
Initial	3 stLabel4	stMonitoringTable								
🛢 📶 Scan	4									
≡ ∰ MAIN										

5. Define local label stLabel5 in the same way.

Position table (input label) setting

The following shows an example of setting the input labels for axes 1 and 2 of M+IAISetPositioningTable_F (Position table setting) by turning on M19 and M119.

M19		_			
		DMOV	K10000	D200	Sets the target position to 10000
			K100	D202	Sets the positioning width to 100
		DMOV	K10	D204	Sets the speed to 10
		DMOV	KO	D206	Sets the individual zone boundary plus side to 0
	Input label for axis 1	DMOV	КО	D208	Sets the individual zone boundary minus side to 0
		MOV	K1	D210	Sets the acceleration to 1
		MOV	К1	D211	Sets the deceleration to 1
		- MOV	H33	D212	Sets the current limit value when pushed to 0033H
		MOV	HO	D213	Sets the load current threshold value to 0
	F		K10000	D300	Sets the target position to 10000
		DMOV	K100	D302	Sets the positioning width to 100
			K10	D304	Sets the speed to 10
		DMOV	КО	D306	Sets the individual zone boundary plus side to 0
	Input label for axis 2		KO	D308	Sets the individual zone boundary minus side to 0
		MOV	К1	D310	Sets the acceleration to 1
		MOV	К1	D311	Sets the deceleration to 1
		MOV	H33	D312	Sets the current limit value when pushed to 0033H
			HO	D313	Sets the load current threshold value to 0

Setting the position table

By turning on i_bEN (Execution command), the information on the positioning operation is set in the positioning table of the target axis by M+IAISetPositioningTable_F (Position table setting).

		M_IAISetPositioningTable_F_00A_1 (Positioning data	M+IAISetPositioningTable_F_00A) setting FB	
M20		B: i_bEN	o_bENO :B	M23 O
Target channel: 1	-[D0]	UW: i_uCh	o_bOK :B	M24 O
Target axis: 1	-[D1]	UW: i_uAxis	o_bErr :B	M25 O
Position table No.: 0	-[D3]	UW: i_uTableNo	o_uErrId :UW -{ D20 }	
M21		B: i_bCurrentRead	o_bUnitErr :B	M26 O
Target position: 10000	-[D200]	D: i_dPosition	o_uUnitErrId :UW -{ D21 }	
Positioning width: 100	-[D202]	UD: i_udWide		
Speed: 10 Individual zone boundary plus	-[D204]	UD: i_udSpeed		
side: 0	-[D206]	D: i_dPulsZone		
minus side: 0	-[D208]	D: i_dMinusZone		
Acceleration: 1	-[D210]	UW: i_uUpSpeed		
Deceleration: 1 Current limit value when	-[D211]	UW: i_uDownSpeed		
pushed: 0033H	-[D212]	UW: i_uElecLimit		
Load current threshold value: 0	-[D213]	UW: i_uLoadCurrentThreshold		
M22		B: i_bControlFlag		

		M_IAISetPositioningTable_F_00A_2 Positioning dat	(M+IAISetPositioningTable_F_00A) ta setting FB	
M120		– B: I_bEN	o_bENO :B	M123 O
Target channel:1	[D0]	}-UW: i_uCh	o_bOK :8	M124
Target axis: 2	[D2]		ojtērr 18	M125
Position table No.: 0	[D4]		o_uErrId :UW-{ D120 }	
M121			o_bUnitErr :8	M126
Target position: 10000	{ D300]] D: i_dPosition	o_uUnitErrId :UW-{ D121 }	
Positioning width: 100	[D302]			
Speed: 10	[D304]			
Individual zone boundary plus side: 0	[D306 ⁻	D: i_dPulsZone		
Individual zone boundary minus side: 0	- [D308]	-] D: i_dMinusZone		
Acceleration: 1	[D310]	 } UW: i_uUpSpeed		
Deceleration: 1	[D311]			
Current limit value when pushed: 0033H	[D312]	 } UW: i_uElecLimit		
Load current threshold value	: 0 [D313]	 } UW: i_uLoadCurrentThreshold		
M122		 B: i_bControlFlag		

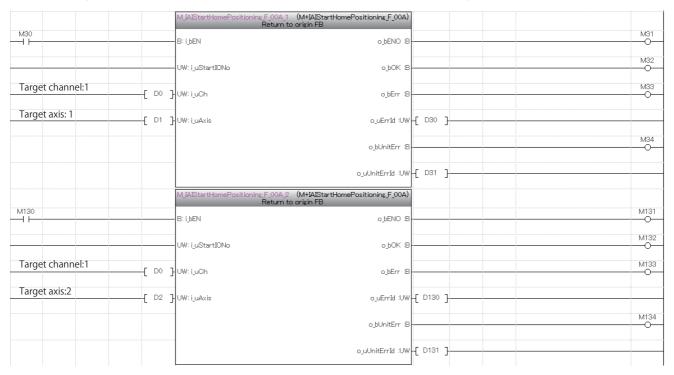
Point P

The positioning table can be configured by using Predefined Protocol Support Tool For Positioning as well. In that case, setting by M+IAISetPositioningTable_F (Position table setting) is not required. For details on the settings by tools, refer to the following.

Predefined Protocol Support Tool For Positioning Operating Manual, Section 7.2 Setting and Editing Positioning Data

Performing the home position return

By turning on i_bEN (Execution command), the home position return is performed by M+IAIStartHomePositioning_F (Home position return). When the home position return is performed, the servo is automatically turned on.



Performing the positioning operation

By turning on i_bEN (Execution command), the positioning operation of the set position table No. is performed by M+IAIStartPositioning_F (Positioning operation). When the positioning operation is performed, the servo is automatically turned on.

	M_IAIStartPositionin: Start	g_F_00A_1 (M+IAIStartPositioning_F_00A) : positioning operation FB	
M40	B: I_bEN	o_bENO :B	M41
	UW: i_uStartIONo	о_ЬОК :В	M42
Target channel:1	[D0] UW: i_uCh	o_bErr :8	M43 O
Target axis: 1	[D1] UW: i_uAxis	o_uErrId :UW -{ D40]
Position table No.: 0	{D3 }UW: i_uTableNo	o_bUnitErr :B	M44
		o_uUnitErrId :UW -{ D41	3
	M_IAIStartPositionin Start	g_F_00A_2 (M+IAIStartPositioning_F_00A) : positioning operation FB	
M140	B: i_bEN	o_bENO :B	M141
	UW: i_uStartIONo	о_ЬОК :В	M142
Target channel:1	[D0] UW: i_uCh	o_bErr :B	M143
Target axis: 2	[D2] UW: i_uAxis	o_uErrId :UW[D140]
Position table No.: 0	{D4]UW: i_uTableNo	o_bUnitErr :B	M144
		o_uUnitErrId :UW -{ D141]

Servo OFF

When performing maintenance of the target axis, turn off the servo by M+IAIServoControl_F (Servo ON/OFF). After normal completion, turn off i_bEN (Execution command).

	M_IAIServaControl_F_00A_1 Serva ON/0	(M+IAIServoControl_F_00A) DFF request FB	
M50	B: i_bEN	o_bENO :B	M53 O
	UW: i_uStartIONo	o_bOK iB	M54
Target channel:1	[D0] UW: i_uCh	o_bErr :B	M55 O
Target axis: 1	{D1 }UW: i_uAxis	o_uErrid :UW -{ D50 }	
M51	B: i_bServo	o_bUnitErr :B	M56
M52	B: i_bPress	o_uUnitErrId :UW -{ D51 }	
	M_IAIServoControl_F_00A_2 Servo ON/0	2 (M+IAIServoControl_F_00A) DFF request FB	
M150	B: i_bEN	o_bENO :B	M153 O
	UW: i_uStartIONo	о_ЬОК :В	M154
Target channel:1	[D0]]UW:i_uCh	o_bErr :8	M155 O
Target axis: 2	[D2] UW: i_uAxis	o_uErrId :UW -{ D150 }	
M151	B: i_bServo	o_bUnitErr :B	M156
M152	B: i_bPress	o_uUnitErrId :UW -{ D151 }	

Acquiring the alarm that has occurred in the IAI controller

If the 203H error occurs in the home position return or positioning operation, an alarm has occurred in the IAI controller. The following shows an example of storing the data in the local labels stLabel4 and stLabel5 of the structure type (stMonitoringTable) in the data register (D) by turning on M60 and M160.

M60		-			
		MOV	stLabel4.uAImDetailCode	D60	Stores the alarm detail code in D60
		MOV	stLabel4.uAImAddress	D61	Stores the alarm address in D61
		MOV	stLabel4.uAlmCode	D62	Stores the alarm code in D62
		DMOV	stLabel4.udAlmTime	D63	Stores the alarm occurrence time in D63
		DMOV	stLabel4.dCurrentPosition	D65	Stores the current position monitor in D65
		MOV	stLabel4.uCurrentAlmCode	D67	Stores the currently occurring alarm code in D67
		MOV	stLabel4.uInputPort	D68	Stores the input port in D68
		MOV	stLabel4.uOutputPort	D69	Stores the output port in D69
		MOV	stLabel4.uStatus1	D70	Stores the device status 1 in D70
	Data in stLabel4	MOV	stLabel4.uStatus2	D71	Stores the device status 2 in D71
		MOV	stLabel4.uExtendedDeviceStatus	D72	Stores the extended device status in D72
		DMOV	stLabel4.udSystemStatus	D73	Stores the system status in D73
		DMOV	stLabel4.dCurrentSpeed	D75	Stores the current speed in D75
		DMOV	stLabel4.dElectricCurrentValue	D77	Stores the current value in D77
		DMOV	stLabel4.dDeviation	D79	Stores the deviation in D79
		DMOV	stLabel4.udSystemOpeTime	D81	Stores the system operation time in D81
		MOV	stLabel4.uSpecialInputPort	D83	Stores the special input port in D83
		- MOV	stLabel4.uZoneStatus	D84	Stores the zone status in D84
		MOV	stLabel4.uDoneOrRunProgramNo	D85	Stores the positioning complete position No. status/ Running program No. in D85
		MOV	stLabel4.uExpansionSystemStatus	D86	Stores the expansion system status in D86

Image: Instruction of the set of th	M160		MOV	AL AL REAL ROOM IN THE	D160	Stores the alarm detail code in D160
Stores the alarm code in D162 Stores the alarm code in D163 Stores the alarm code in D165 Stores the current position monitor in D167 Stores the current position monitor in D168 Stores the output port in D168 Stores the output port in D169 Stores the device status 1 in D170 Stores the device status 2 in D171 Stores the device status 2 in D171 Stores the device status 2 in D171 Stores the device status in D172 Stores the extended device status in D172 Stores the current value in D175 Stores the devication in D179 Stores the devication in D179 Stores the devication in D179 Stores the devication in D179 Stores the system operation time in D181 Stores the system operation time in D181 Stores the special input port in D183 Stores the position No. in D185				stLabel5.uAlmDetailCode	DIOU	
Image:			MOV	stLabel5.uAlmAddress	D161	Stores the alarm address in D161
Image: Start Star			MOV	stLabel5.uAlmCode	D162	Stores the alarm code in D162
Image: Stress the currently occurring alarm code in D167 Image: Stress the currently occurring alarm code in D167 Image: Stress the currently occurring alarm code in D168 Image: Stress the currently occurring alarm code in D168 Image: Stress the currently occurring alarm code in D168 Image: Stress the currently occurring alarm code in D168 Image: Stress the currently occurring alarm code in D168 Image: Stress the output port in D169 Image: Stress the output port in D172 Image: Stress the output port in D173 Image: Str			DMOV	stLabel5.udAlmTime	D163	Stores the alarm occurrence time in D163
Image: State in the state			DMOV	stLabel5.dCurrentPosition	D165	Stores the current position monitor in D165
Image: State of the state			MOV	stLabel5.uCurrentAlmCode	D167	Stores the currently occurring alarm code in D167
Image: Solution of the second seco			MOV	stLabel5.uInputPort	D168	Stores the input port in D168
Image: Solution of the second state			MOV	stLabel5.uOutputPort	D169	Stores the output port in D169
Data in stLabel5 MOV stLabel5 uExtendedDeviceStatus D172 Stores the extended device status in D173 Stores the extended device status in D173 Stores the system status in D173 Stores the system status in D173 Stores the current speed in D175 Stores the current speed in D175 Stores the current value in D177 Stores the current value in D177 Stores the deviation in D179 Stores the system operation time in D181 Stores the special input port in D183 Stores the zone status in D184 Stores the corrent value in D184 Stores the special input port in D185	Data in stL		MOV	stLabel5.uStatus1	D170	Stores the device status 1 in D170
Image: Solution of the system of the syst		Data in stl abol5	MOV	stLabel5.uStatus2	D171	Stores the device status 2 in D171
Image: Construct of the co			MOV	stLabel5.uExtendedDeviceStatus	D172	Stores the extended device status in D172
Image: Solution of the system operation in D179 Stores the current value in D177 Image: Solution of the system operation in D179 Stores the deviation in D179 Image: Solution of the system operation time in D181 Stores the system operation time in D181 Image: Solution of the system operation time in D181 Stores the system operation time in D183 Image: Solution of the system operation time in D183 Stores the system operation time in D183 Image: Solution of the system operation time of the system operation time of the system operation time in D183 Stores the special input port in D183 Image: Solution of the system operation time operation time operation time of the system operation time oper			DMOV	stLabel5.udSystemStatus	D173	Stores the system status in D173
Image: State Stat			DMOV	stLabel5.dCurrentSpeed	D175	Stores the current speed in D175
Image: State in the system operation time in D181 Image: State in the system operation time in D181 Image: State in the system operation time in D181 Image: State in the system operation time in D181 Image: State in the system operation time in D181 Image: State in the system operation time in D181 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation time in D183 Image: State in the system operation tin the system operation time in D183			DMOV	stLabel5.dElectricCurrentValue	D177	Stores the current value in D177
Image: Stress the special input port in D183 Image: Stress the special input port in D185 Image: Stress the special input port in D185			DMOV	stLabel5.dDeviation	D179	Stores the deviation in D179
MOV stLabel5 uZoneStatus D184 Stores the zone status in D184 MOV stLabel5 uZoneOrRunProgramNo D185			DMOV	stLabel5.udSystemOpeTime	D181	Stores the system operation time in D181
MOV stLabe5.uDoneOrRunProgramNo D185 Stores the positioning complete position No. status Running program No. in D185			MOV	stLabel5.uSpecialInputPort	D183	Stores the special input port in D183
MOV sttabels uDoneOrkunProgramNo D185 Running program No. in D185 0 0 0			MOV	stLabel5.uZoneStatus	D184	Stores the zone status in D184
			MOV	stLabel5.uDoneOrRunProgramNo	D185	Stores the positioning complete position No. status/ Running program No. in D185
MOV stLaber5uExpansionSystemStatus D186 Stores the expansion system status in D186			MOV	stLabel5.uExpansionSystemStatus	D186	Stores the expansion system status in D186

Resetting the alarm that has occurred in the IAI controller

When an alarm code is stored in D62 or D162, the alarm that has occurred in the IAI controller is reset by M+IAIMonitoring_F (Operation monitor) by turning on i_bAImReset (Alarm reset).

		M_IAIMonitoring_F_00A_1 Monitor and	(M+IAIMonitoring_F_00A) alarm reset FB		
M10		B: i_bEN	o_bENO :B		M12
		-UW: i_uStartIONo	0_60K :8-		M13
Target channel: 1	[D0]	UW: i_uCh	o_bErr :B·		M14
Target axis: 1	[D1]	UW: i_uAxis	o_uErrId :UW-	[D10]	
M11 		B: i_bAlmReset	o_bUnitErr :B·		M15 O
			o_uUnitErrId :UW-	-[D11]	
			o_bMonitorOK :B		M16
			o_stMonitoringTable :DUT	-[stLabel4]	
		M_IAIMonitorins_F_00A_2 Monitor and	(M+IAMonitoring_F_00A) alarm reset FB		
		B: i_bEN	o_bENO :B		M112
		-UW: i_uStartIONo	o_bOK :B·		M113
Target channel:1	[D0]	-UW: i_uCh	o_bErr :B·		M114
Target axis: 2	[D2]	-UW: i_uAxis	o_uErrId :UW-	[D110]	
M1111		B: i_bAlmReset	o_bUnitErr :B·		M115
			o_uUnitErrId :UW-	[D111]	
			o_bMonitorOK :B		M116
			o_stMonitoringTable :DUT	-[stLabel5]	

■Redefining local labels

When the above program examples are copied and pasted, the function blocks and local labels stLabel4 and stLabel5 become undefined.

For details on how to redefine function blocks, refer to the following.

Page 57 How to Use the Program Copy Function of e-Manual

The method for redefining local labels stLabel4 and stLabel5 is explained in the following.

Page 42 Redefining local labels

6 TROUBLESHOOTING

6.1 Checking Procedure

This section describes how to check the status of the programmable controller and the IAI controller.

Checking the LED status

Check the communication status with the LEDs of the programmable controller and IAI controller.

Item	Reference					
Programmable controller	Page 54 Checking the LED status					
IAI controller	Page 55 Checking the LED status					

Checking the error code

Check the following depending on the error code of the error that has occurred in the programmable controller or the IAI controller.

Item	Reference					
Programmable controller	Page 54 Checking the error details					
IAI controller	Amoual for the IAI controller being used					

Checking the wiring

Check that the Ethernet cables are fully inserted.

Page 9 System Configuration

Checking the communication settings

Check the content of the parameter settings on GX Works3 against the parameter settings of the IAI controller.

Item	Reference					
Programmable controller	Page 18 Parameter Settings					
IAI controller	Page 16 Parameter Settings					

Checking the programs

Check that the programs are created as shown in the program examples.

Page 33 PROGRAM EXAMPLE

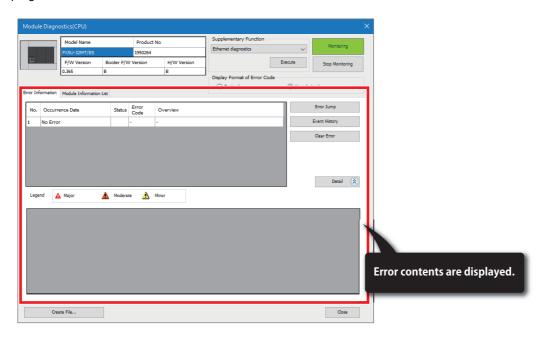
Checking the LED status

Check the programmable controller status with the LED.

RS-485 RD SD Faulty communications: ON (Flicks at regular interval.)
SD Disconnection of Ethernet cable of
LAN SD/RD the programmable controller: OFF

Checking the error details

On the toolbar of GX Works3, select [Diagnostics] ⇒ [Module Diagnostics (CPU Diagnostics)]. The error details of the programmable controller can be checked.

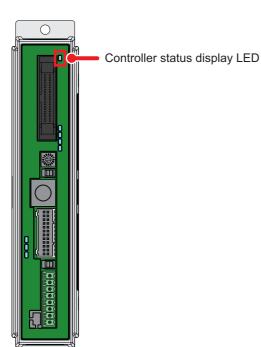


For details on troubleshooting and error codes, refer to the following.

6.3 Checking the IAI Controller

Checking the LED status

Check the LED status of the IAI controller.



For the LED indications of the IAI controller, refer to the following.

Page 15 Part Names

For details on error codes, refer to the following.

Manual for the IAI controller being used

APPENDIX

Appendix 1 List of FBs for Predefined Protocol Support for Positioning

The following table lists the FBs included in the FB library for Predefined Protocol Support for Positioning. Programs are created by combining FBs according to each application.

Name	Description
M+IAIStartHomePositioning_F	Executes the home position return.
M+IAIJogInching_F	Performs the JOG operation or inching operation.
M+IAIReadPositioningTable_F	Reads the specified position table data.
M+IAISetPositioningTable_F	Sets the specified position table data.
M+IAIStartPositioning_F	Starts the positioning operation.
M+IAIMonitoring_F	Monitors the current position and alarms, and performs the alarm reset.
M+IAIServoContorol_F	Controls the servo ON/OFF.

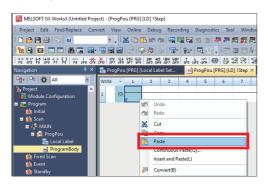
Appendix 2 How to Use the Program Copy Function of e-Manual

Program examples in e-Manual can be copied and pasted to GX Works3.

1. Click "Copy Ladder Program (for GX Works3)" in e-Manual.

[D0] Station number	W:i_wStationNo Station number	o_bOK:B Normal end	M231 Normal end
[D220] Parameter number	W:i_wParameterNo Parameter number	o_bErr:B Failed end owErrID:W	M232 Failed end
		o_wParameterVal:W Parameter value which was read	Error code [D231] Parameter value
			which was read END Copy Ladder Program (for GX Works3)

2. Right-click the mouse on the ladder editor of GX Works3, and select [Paste].



3. The copied program is pasted in undefined state. Select the FB used in the program example from [Library] on the "Element Selection" window, and drag and drop it to the FB area on the ladder editor.

MELSOFT GX Works3 (Untitled P	reject) - (PregPo	u (PRG) (LD) 15tep *)											- 0	х
Project Edit Find/Replace C	Convert View													- 0 ×
		12	6 🗈 15 in ai 🔤 🛱	🖼 15 (2) 🚑 🖉 🛱	最高調 陽際 記載す	8 🖪 🖪 🛃 🖯 O O 🗧	82%							
i 🗅 😁 🗃 🗃 😒 😺	Η.									10	a 🕲 🕲 🛺 Marz	8		۰.
123 8 C A C 8	g- 🐨 📷 📾	df 🖓 🚧 🏷 🕞	ia 🗠 -				3388.							
[상봉상황상요] 규슈;	ある おお	양정 않않았는	리가가것 등 않:	22 2 2 5	商商生生 生老泉 泉	(昭禄台업도일)((昭禄台업도일)	388.							
Navigation 🕴 🛪	🗿 ProgPau (PRG] [Local Label Set	ProgPou (PRG) (LD)	IStep * ×						4.0 -	Element Selection			7 × 🔳
· · · · · · · · · · · · · · · · · · ·	Write	1 2	3 4 5	6		7	8	9 20	11 12		(Find POU)	新賀 信日	译- 风 (公告	□× §.
Project	15			M_INVERTER_CC_IEF_	Basic_Running_F_00A_1 (M+RVEP	RTER-CC-IEF-Basic_Running_	F.Ø.			I Ü	30-			A .
Module Configuration		MD		U HPN		o 1	200		H10		User Library			
total	16	_,		COON		0_0	ENU			1	Ubrary B BA INVERTER-CC-IEF-Basic, F		WERTER-CC-IEF-E	
■ 🚯 Scan ■ 🖓 NAAN	17		[00	} i_wStationNo		0	50K		N11		B Can Fil		VENERALINER	6094 C
e hala		MI							M12		🗄 🕌 MELSOFT_FBRILE			
Tecal Label	18	-11		i bForward		0,	Nor				Im M+INVERTER-CC Im M+INVERTER-CC			Kede
 Importine Incedision 		10					-[010]-				M+INVERTER-CC			
Event	19					0,0	end on 3-			1	M+INVERTER-CC			
t Standby	20		rag and	dron							I M+INVERTER-CC	-EF-Basic_Read Re	adParameter	_
No Execution Type Unregistered Program			iag and	auop							M+INVERTER-CC	-EF-Basic Runn Pa	unting	
FB/TUN	21	H .								-		1011030-3011-38		-
🗉 🌆 Label		MS	_								M+INVERTER-CC Im M+INVERTER-CC			
🖬 💕 Device	22			- i Now							a normenan-ce	der stand und in	maning mag	

Point P

When an FB is used in the program example, the definition of the FB will be unclear immediately after the program is pasted to the ladder editor. Drag and drop the FB from the "Element Selection" window to define the FB properly.

Inclear definition of FB	Properly defined FB
R_CC_IEF_Basic_Running_F_00A_1 (M+INVERTER-CC-IEF-Basic_Running_F_	M_INVERTER_CC_IEF_Basic_Running_F_00A_1 (M+INVERTER-CC-IEF-Basic_ Running
o_bENO	B: i_bEN
• •_bOK	W: i_wStationNo
o_bErr	B: i_bForword
o_wErrID	B. i_bReverse
	B: i_bHigh
	B: i_bMiddle
	B: i_bLow
	4 L



4. Click the [OK] button on the "FB Instance Name" window.

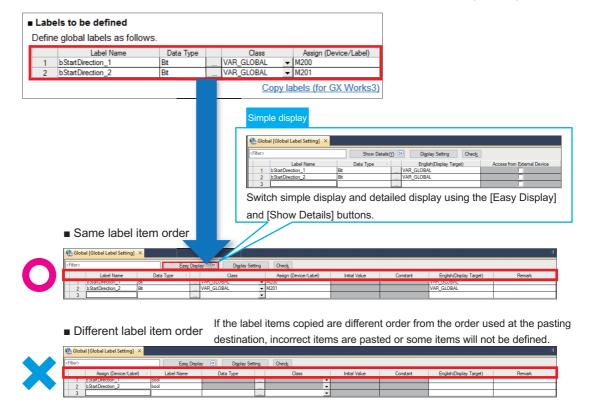
FB Instance Name	×
Local Label (ProgPou) 🗸 🗸	OK
M_INVERTER_CC_IEF_Basic_Running_F_00A_1	Exit

5. When the FB is properly defined, the FB instance name is highlighted in gray.

Write	× 1	2	3	4	5	6	7	8	9	10	11	12
15						M_INVERTER_CC_IEF_Basic_Running_F_0	A_1 (M+INVERTER-CC-IEF-Basic_Running_F_ nning					
16						B: i_bEN	o_bENO:B					0
17						W: i_wStationNo	o_bOK:B					0
18	M1					B: i_bForword	o_bErr:B					M1:
19	M2					B: i_bReverse	o_wErrID:W	-[D10]				
20	M3					B:i_bHigh						
21	M4					B:i_bMiddle						
22	M5					B:i_bLow						

Point P

Label items (label name, data type, and others) are copied in the order defined as an example in this manual. Therefore, define label items in the same order as shown on the label editor of the engineering tool.



Appendix 3 GOT2000 Series Connection Sample Windows

Making a direct connection with GOT and using a sample window for monitoring and changing the current values or setting values of an IAI controller reduces the working hours for creating a GOT display window and contributes to the connection with an IAI controller.

The applicable models are as follows.

- PCON series
- ACON series
- SCON series

For information on sample windows for connecting GOT2000 and each controller, please contact your local Mitsubishi Electric representative.

Main Monit	09/ IS/2022 ID: 43 💽									
Status						Manual Operation				
Current Position (mm	1234.55			Speed [mm/s]			1234.55			
Current Speed [mm/s	1234.56			Inching Distance (mm)			1234.56			
Electric Current [mA]	Electric Current [mA]			1234			Data Storage No.			
Alarm Code	240 Detail			Jog Mode		F	Read Current Position			
AUTO Home Return Che Sensor	PIO Stopped			Backward JOG-			Forward JOG+			
Servo OFF	Returning to Home			Positio	ning					
Major Failure	Minor Failure			Execution No.						
Emergency Stop	ABS Battery Voltage Low			Complet			-	-		
Servo ON/OFF	et	No.		סכ	Đ	ecute				
Menu Main Mor Operation		dit Position Data	I/O Port Monitor	Tre	nd Graph	Multi-Axis Monitor	Axis	Setting		

REVISIONS

Revision date	Version	Description
October 2022	А	First edition

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WARRANTY

Please confirm the following product warranty details before using this product.

MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware), WARRANTY

Manuals for the IAI controller and ROBO Cylinder being used, Warranty

SAFETY PRECAUTIONS

- Before using the product introduced in this manual, please read the manuals for the product carefully to handle the product correctly.
- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, please contact Mitsubishi Electric sales office.
- The product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions into the system.
- · For design, wiring, and other precautions, read "SAFETY PRECAUTIONS" in the relevant manuals.

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USA	MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch Boulevard Miguel de Cervantes Saavedra 301, Torre Norte Piso 5, Ampliacion Granada, Miguel Hidalgo, Ciudad de Mexico, Mexico, C.P.115200	Tel : +52-55-3067-7512
Brazil	MITSUBISHI ELECTRIC DO BRASIL COMERCIO E SERVICOS LTDA. Avenida Adelino Cardana, 293, 21 andar, Bethaville, Barueri SP, Brasil	Tel : +55-11-4689-3000 Fax : +55-11-4689-3016
Germany	MITSUBISHI ELECTRIC EUROPE B.V. German Branch Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany	Tel : +49-2102-486-0 Fax : +49-2102-486-7780
UK	MITSUBISHI ELECTRIC EUROPE B.V. UK Branch Travellers Lane, UK-Hatfield, Hertfordshire, AL10 8XB, U.K.	Tel : +44-1707-28-8780 Fax : +44-1707-27-8695
Ireland	MITSUBISHI ELECTRIC EUROPE B.V. Irish Branch Westgate Business Park, Ballymount, Dublin 24, Ireland	Tel : +353-1-4198800 Fax : +353-1-4198890
Italy	MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch Centro Direzionale Colleoni - Palazzo Sirio, Viale Colleoni 7, 20864 Agrate Brianza (MB), Italy	Tel : +39-039-60531 Fax : +39-039-6053-312
Spain	MITSUBISHI ELECTRIC EUROPE, B.V. Spanish Branch Carretera de Rubi, 76-80-Apdo. 420, E-08190 Sant Cugat del Valles (Barcelona), Spain	Tel : +34-935-65-3131 Fax : +34-935-89-1579
France	MITSUBISHI ELECTRIC EUROPE B.V. French Branch 25, Boulevard des Bouvets, 92741 Nanterre Cedex, France	Tel : +33-1-55-68-55-68 Fax : +33-1-55-68-57-57
Czech Republic	MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch, Prague Office Pekarska 621/7, 155 00 Praha 5, Czech Republic	Tel : +420-255-719-200
Poland	MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch ul. Krakowska 48, 32-083 Balice, Poland	Tel : +48-12-347-65-00
Sweden	MITSUBISHI ELECTRIC EUROPE B.V. (Scandinavia) Hedvig Mollersgata 6, 223 55 Lund, Sweden	Tel : +46-8-625-10-00 Fax : +46-46-39-70-18
Russia	MITSUBISHI ELECTRIC (RUSSIA) LLC St. Petersburg Branch Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; 195027 St. Petersburg, Russia	Tel : +7-812-633-3497 Fax : +7-812-633-3499
Turkey	MITSUBISHI ELECTRIC TURKEY A.S. Umraniye Branch Serifali Mah. Kale Sok. No:41 34775 Umraniye - Istanbul, Turkey	Tel : +90-216-969-2500 Fax : +90-216-661-4447
UAE	MITSUBISHI ELECTRIC EUROPE B.V. Dubai Branch Dubai Silicon Oasis, P.O.BOX 341241, Dubai, U.A.E.	Tel : +971-4-3724716 Fax : +971-4-3724721
South Africa	ADROIT TECHNOLOGIES 20 Waterford Office Park, 189 Witkoppen Road, Fourways, South Africa	Tel : +27-11-658-8100 Fax : +27-11-658-8101
China	MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Mitsubishi Electric Automation Center, No.1386 Hongqiao Road, Shanghai, China	Tel : +86-21-2322-3030 Fax : +86-21-2322-3000
Taiwan	SETSUYO ENTERPRISE CO., LTD. 6F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan	Tel : +886-2-2299-2499 Fax : +886-2-2299-2509
Korea	MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD. 7F to 9F, Gangseo Hangang Xi-tower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 07528, Korea	Tel : +82-2-3660-9569 Fax : +82-2-3664-8372
Singapore	MITSUBISHI ELECTRIC ASIA PTE. LTD. 307 Alexandra Road, Mitsubishi Electric Building, Singapore 159943	Tel : +65-6473-2308 Fax : +65-6476-7439
Thailand	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD. 12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpang, Khet Yannawa, Bangkok 10120, Thailand	Tel : +66-2682-6522-31 Fax : +66-2682-6020
Vietnam	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Unit 01-04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam	Tel : +84-28-3910-5945 Fax : +84-28-3910-5947
Indonesia	PT. MITSUBISHI ELECTRIC INDONESIA Gedung Jaya 8th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia	Tel : +62-21-31926461 Fax : +62-21-31923942
India	MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune-411026, Maharashtra, India	Tel : +91-20-2710-2000 Fax : +91-20-2710-2100
Australia	MITSUBISHI ELECTRIC AUSTRALIA PTY. LTD. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245

MITSUBISHI ELECTRIC CORPORATION HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

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